FIG. 1A

```
atg gct agc atg tca atg tcc tat aca tgg aca ggc gcc ctg atc aca      48
Met Ala Ser Met Ser Met Ser Tyr Thr Trp Thr Gly Ala Leu Ile Thr
1               5                  10                  15

ccg tgc gct gcg gag gaa agc aag ctg ccc atc aac gcg ctg agc aac      96
Pro Cys Ala Ala Glu Glu Ser Lys Leu Pro Ile Asn Ala Leu Ser Asn
            20                  25                  30

tcc ttg ctg cgt cac cat aac ctg gtc tat tcc aca aca tcc cgc agt     144
Ser Leu Leu Arg His His Asn Leu Val Tyr Ser Thr Thr Ser Arg Ser
        35                  40                  45

gca agc ctg cgg cag aag aag gtc acc ttt gac aga ctg caa gtc ctg     192
Ala Ser Leu Arg Gln Lys Lys Val Thr Phe Asp Arg Leu Gln Val Leu
    50                  55                  60

gac gat cat tac cgg gac gtg ctc aag gag atg aag gcg aag gcg tcc     240
Asp Asp His Tyr Arg Asp Val Leu Lys Glu Met Lys Ala Lys Ala Ser
65                  70                  75                  80

aca gtg aag gct aaa ctg cta tct gta gaa gaa gca tgc aag ctg acg     288
Thr Val Lys Ala Lys Leu Leu Ser Val Glu Glu Ala Cys Lys Leu Thr
                85                  90                  95

ccc ccg cat tcg gcc aaa tcc aaa ttt ggc tat ggg gca aag gac gtc     336
Pro Pro His Ser Ala Lys Ser Lys Phe Gly Tyr Gly Ala Lys Asp Val
            100                 105                 110

cgg agc cta tcc agc agg gcc gtt aac cac atc cgc tcc gtg tgg aag     384
Arg Ser Leu Ser Ser Arg Ala Val Asn His Ile Arg Ser Val Trp Lys
        115                 120                 125

gac ttg ctg gag gac act gac aca cca att cag acc acc atc atg gca     432
Asp Leu Leu Glu Asp Thr Asp Thr Pro Ile Gln Thr Thr Ile Met Ala
    130                 135                 140

aaa aat gag gtt ttc tgc gtc caa cca gag aaa gga ggc cgc aaa cca     480
Lys Asn Glu Val Phe Cys Val Gln Pro Glu Lys Gly Gly Arg Lys Pro
145                 150                 155                 160

gct cgc ctc atc gta ttc cca gac ctg gga gtt cgt gta tgc gag aag     528
Ala Arg Leu Ile Val Phe Pro Asp Leu Gly Val Arg Val Cys Glu Lys
                165                 170                 175

atg gcc ctt tac gac gtg gtt tcc act ctt cct cag gcc gtg atg ggc     576
Met Ala Leu Tyr Asp Val Val Ser Thr Leu Pro Gln Ala Val Met Gly
            180                 185                 190

tcc tca tac gga ttc caa tac tct cct aag cag cgg gtc gag ttc ctg     624
Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Lys Gln Arg Val Glu Phe Leu
        195                 200                 205

gtg aat acc tgg aaa gca aag aaa tgc cct atg ggc ttc tca tat gac     672
Val Asn Thr Trp Lys Ala Lys Lys Cys Pro Met Gly Phe Ser Tyr Asp
    210                 215                 220
```

FIG. 1B

```
acc cgc tgt ttt gac tca acg gtc act gag aat gac atc cgt gtt gag      720
Thr Arg Cys Phe Asp Ser Thr Val Thr Glu Asn Asp Ile Arg Val Glu
225                 230                 235                 240

gag tca att tac caa tgt tgt gac ttg gcc ccc gaa gct aga cag gcc      768
Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala
                245                 250                 255

ata agg tcg ctc aca gag cgg ctc tat gtc ggg ggt ccc atg act aac      816
Ile Arg Ser Leu Thr Glu Arg Leu Tyr Val Gly Gly Pro Met Thr Asn
            260                 265                 270

tcc aaa ggg cag aac tgc ggc tat cgc cgg tgc cgc gcg agc ggc gtg      864
Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val
        275                 280                 285

ctg acg act agc tgc ggt aat acc ctc aca tgc tac ttg aag gcc gct      912
Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ala
    290                 295                 300

gca gcc tgt cga gct gcc aag ctc cag gac tgc acg atg ctc gtg aat      960
Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn
305                 310                 315                 320

gga gac gac ctt gtc gtt atc tgt gaa agc gcg gga acc caa gag gac     1008
Gly Asp Asp Leu Val Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp
                325                 330                 335

gcg gca agc cta cga gtc ttc acg gag gct atg act agg tac tct gcc     1056
Ala Ala Ser Leu Arg Val Phe Thr Glu Ala Met Thr Arg Tyr Ser Ala
            340                 345                 350

ccc cct ggg gac ccg ccc caa ccg gaa tac gac ttg gag ctg ata aca     1104
Pro Pro Gly Asp Pro Pro Gln Pro Glu Tyr Asp Leu Glu Leu Ile Thr
        355                 360                 365

tcg tgt tcc tcc aat gtg tcg gtc gca cac gat gca tct ggc aaa agg     1152
Ser Cys Ser Ser Asn Val Ser Val Ala His Asp Ala Ser Gly Lys Arg
    370                 375                 380

gtg tac tac ctc acc cgt gac ccc acc gtc ccc ctt gcg cgg gct gcg     1200
Val Tyr Tyr Leu Thr Arg Asp Pro Thr Val Pro Leu Ala Arg Ala Ala
385                 390                 395                 400

tgg gag aca gct agg cac act cca gtc aac tcc tgg cta ggc aac atc     1248
Trp Glu Thr Ala Arg His Thr Pro Val Asn Ser Trp Leu Gly Asn Ile
                405                 410                 415

atc atg tat gcg ccc act ttg tgg gca agg atg att ctg atg act cac     1296
Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg Met Ile Leu Met Thr His
            420                 425                 430

ttc ttc tcc atc ctt cta gcc cag gag caa ctt gaa aaa gcc ctg gat     1344
Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln Leu Glu Lys Ala Leu Asp
        435                 440                 445
```

FIG. 1C

```
tgt cag atc tac ggg gct tgt tac tcc att gag cca ctt gac cta cct     1392
Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile Glu Pro Leu Asp Leu Pro
    450                 455                 460

cag atc att gaa cga ctc cat ggt ctt agc gca ttt tca ctc cat agt     1440
Gln Ile Ile Glu Arg Leu His Gly Leu Ser Ala Phe Ser Leu His Ser
465                 470                 475                 480

tac tct cca ggt gag atc aat agg gtg gct tca tgc ctc agg aag ctt     1488
Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala Ser Cys Leu Arg Lys Leu
                485                 490                 495

ggg gta cca ccc ttg cga gtc tgg aga cat cgg gcc aga agt gtc cgc     1536
Gly Val Pro Pro Leu Arg Val Trp Arg His Arg Ala Arg Ser Val Arg
            500                 505                 510

gct aag tta ctg tcc cag ggg ggg agg gcc gcc att tgt ggc aag tac     1584
Ala Lys Leu Leu Ser Gln Gly Gly Arg Ala Ala Ile Cys Gly Lys Tyr
        515                 520                 525

ctc ttc aac tgg gca gta agg acc aag ctt aaa ctc act cca att ccg     1632
Leu Phe Asn Trp Ala Val Arg Thr Lys Leu Lys Leu Thr Pro Ile Pro
    530                 535                 540

gct gcg tcc cgg ctg gac ttg tcc ggc tgg ttc gtt gct ggc tac agc     1680
Ala Ala Ser Arg Leu Asp Leu Ser Gly Trp Phe Val Ala Gly Tyr Ser
545                 550                 555                 560

ggg gga gac ata tat cac agc ctg tct cgt gcc cga ccc cgc tgg ttc     1728
Gly Gly Asp Ile Tyr His Ser Leu Ser Arg Ala Arg Pro Arg Trp Phe
                565                 570                 575

atg ttg tgc cta ctc cta ctc tcc gta ggg gta ggc atc tat cta ctc     1776
Met Leu Cys Leu Leu Leu Leu Ser Val Gly Val Gly Ile Tyr Leu Leu
            580                 585                 590

ccc aac cgg cat cac cat cac cat cac                                 1803
Pro Asn Arg His His His His His His
        595                 600
```

FIG. 2A

```
atg gct agc atg tca atg tcc tat aca tgg aca ggc gcc ctg atc aca        48
Met Ala Ser Met Ser Met Ser Tyr Thr Trp Thr Gly Ala Leu Ile Thr
1               5                  10                  15

ccg tgc gct gcg gag gaa agc aag ctg ccc atc aac gcg ctg agc aac        96
Pro Cys Ala Ala Glu Glu Ser Lys Leu Pro Ile Asn Ala Leu Ser Asn
            20                  25                  30

tcc ttg ctg cgt cac cat aac ctg gtc tat tcc aca aca tcc cgc agt       144
Ser Leu Leu Arg His His Asn Leu Val Tyr Ser Thr Thr Ser Arg Ser
        35                  40                  45

gca agc ctg cgg cag aag aag gtc acc ttt gac aga ctg caa gtc ctg       192
Ala Ser Leu Arg Gln Lys Lys Val Thr Phe Asp Arg Leu Gln Val Leu
    50                  55                  60

gac gat cat tac cgg gac gtg ctc aag gag atg aag gcg aag gcg tcc       240
Asp Asp His Tyr Arg Asp Val Leu Lys Glu Met Lys Ala Lys Ala Ser
65                  70                  75                  80

aca gtg aag gct aaa ctg cta tct gta gaa gaa gca tgc aag ctg acg       288
Thr Val Lys Ala Lys Leu Leu Ser Val Glu Glu Ala Cys Lys Leu Thr
                85                  90                  95

ccc ccg cat tcg gcc aaa tcc aaa ttt ggc tat ggg gca aag gac gtc       336
Pro Pro His Ser Ala Lys Ser Lys Phe Gly Tyr Gly Ala Lys Asp Val
            100                 105                 110

cgg agc cta tcc agc agg gcc gtt aac cac atc cgc tcc gtg tgg aag       384
Arg Ser Leu Ser Ser Arg Ala Val Asn His Ile Arg Ser Val Trp Lys
        115                 120                 125

gac ttg ctg gag gac act gac aca cca att cag acc acc atc atg gca       432
Asp Leu Leu Glu Asp Thr Asp Thr Pro Ile Gln Thr Thr Ile Met Ala
    130                 135                 140

aaa aat gag gtt ttc tgc gtc caa cca gag aaa gga ggc cgc aaa cca       480
Lys Asn Glu Val Phe Cys Val Gln Pro Glu Lys Gly Gly Arg Lys Pro
145                 150                 155                 160

gct cgc ctc atc gta ttc cca gac ctg gga gtt cgt gta tgc gag aag       528
Ala Arg Leu Ile Val Phe Pro Asp Leu Gly Val Arg Val Cys Glu Lys
                165                 170                 175

atg gcc ctt tac gac gtg gtt tcc act ctt cct cag gcc gtg atg ggc       576
Met Ala Leu Tyr Asp Val Val Ser Thr Leu Pro Gln Ala Val Met Gly
            180                 185                 190

tcc tca tac gga ttc caa tac tct cct aag cag cgg gtc gag ttc ctg       624
Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Lys Gln Arg Val Glu Phe Leu
        195                 200                 205

gtg aat acc tgg aaa gca aag aaa tgc cct atg ggc ttc tca tat gac       672
Val Asn Thr Trp Lys Ala Lys Lys Cys Pro Met Gly Phe Ser Tyr Asp
    210                 215                 220
```

FIG. 2B

```
acc cgc tgt ttt gac tca acg gtc act gag aat gac atc cgt gtt gag      720
Thr Arg Cys Phe Asp Ser Thr Val Thr Glu Asn Asp Ile Arg Val Glu
225                 230                 235                 240

gag tca att tac caa tgt tgt gac ttg gcc ccc gaa gct aga cag gcc      768
Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala
                245                 250                 255

ata agg tcg ctc aca gag cgg ctc tat gtc ggg ggt ccc atg act aac      816
Ile Arg Ser Leu Thr Glu Arg Leu Tyr Val Gly Gly Pro Met Thr Asn
            260                 265                 270

tcc aaa ggg cag aac tgc ggc tat cgc cgg tgc cgc gcg agc ggc gtg      864
Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val
        275                 280                 285

ctg acg act agc tgc ggt aat acc ctc aca tgc tac ttg aag gcc gct      912
Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ala
    290                 295                 300

gca gcc tgt cga gct gcc aag ctc cag gac tgc acg atg ctc gtg aat      960
Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn
305                 310                 315                 320

gga gac gac ctt gtc gtt atc tgt gaa agc gcg gga acc caa gag gac     1008
Gly Asp Asp Leu Val Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp
                325                 330                 335

gcg gca agc cta cga gtc ttc acg gag gct atg act agg tac tct gcc     1056
Ala Ala Ser Leu Arg Val Phe Thr Glu Ala Met Thr Arg Tyr Ser Ala
            340                 345                 350

ccc cct ggg gac ccg ccc caa ccg gaa tac gac ttg gag ctg ata aca     1104
Pro Pro Gly Asp Pro Pro Gln Pro Glu Tyr Asp Leu Glu Leu Ile Thr
        355                 360                 365

tcg tgt tcc tcc aat gtg tcg gtc gca cac gat gca tct ggc aaa agg     1152
Ser Cys Ser Ser Asn Val Ser Val Ala His Asp Ala Ser Gly Lys Arg
    370                 375                 380

gtg tac tac ctc acc cgt gac ccc acc gtc ccc ctt gcg cgg gct gcg     1200
Val Tyr Tyr Leu Thr Arg Asp Pro Thr Val Pro Leu Ala Arg Ala Ala
385                 390                 395                 400

tgg gag aca gct agg cac act cca gtc aac tcc tgg cta ggc aac atc     1248
Trp Glu Thr Ala Arg His Thr Pro Val Asn Ser Trp Leu Gly Asn Ile
                405                 410                 415

atc atg tat gcg ccc act ttg tgg gca agg atg att ctg atg act cac     1296
Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg Met Ile Leu Met Thr His
            420                 425                 430

ttc ttc tcc atc ctt cta gcc cag gag caa ctt gaa aaa gcc ctg gat     1344
Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln Leu Glu Lys Ala Leu Asp
        435                 440                 445
```

FIG. 2C

```
tgt cag atc tac ggg gct tgt tac tcc att gag cca ctt gac cta cct     1392
Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile Glu Pro Leu Asp Leu Pro
    450                 455                 460

cag atc att gaa cga ctc cat ggt ctt agc gca ttt tca ctc cat agt     1440
Gln Ile Ile Glu Arg Leu His Gly Leu Ser Ala Phe Ser Leu His Ser
465                 470                 475                 480

tac tct cca ggt gag atc aat agg gtg gct tca tgc ctc agg aag ctt     1488
Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala Ser Cys Leu Arg Lys Leu
                485                 490                 495

ggg gta cca ccc ttg cga gtc tgg aga cat cgg gcc aga agt gtc cgc     1536
Gly Val Pro Pro Leu Arg Val Trp Arg His Arg Ala Arg Ser Val Arg
            500                 505                 510

gct aag tta ctg tcc cag ggg ggg agg gcc gcc att tgt ggc aag tac     1584
Ala Lys Leu Leu Ser Gln Gly Gly Arg Ala Ala Ile Cys Gly Lys Tyr
        515                 520                 525

ctc ttc aac tgg gca gta agg acc aag ctt aaa ctc act cca att ccg     1632
Leu Phe Asn Trp Ala Val Arg Thr Lys Leu Lys Leu Thr Pro Ile Pro
    530                 535                 540

gct gcg tcc cgg ctg gac ttg tcc ggc tgg ttc gtt gct ggc tac agc     1680
Ala Ala Ser Arg Leu Asp Leu Ser Gly Trp Phe Val Ala Gly Tyr Ser
545                 550                 555                 560

ggg gga gac ata tat cac agc ctg tct cgt gcc cga ccc cgc cat cac     1728
Gly Gly Asp Ile Tyr His Ser Leu Ser Arg Ala Arg Pro Arg His His
                565                 570                 575

cat cac cat cac                                                    1740
His His His His
            580
```

FIG. 3

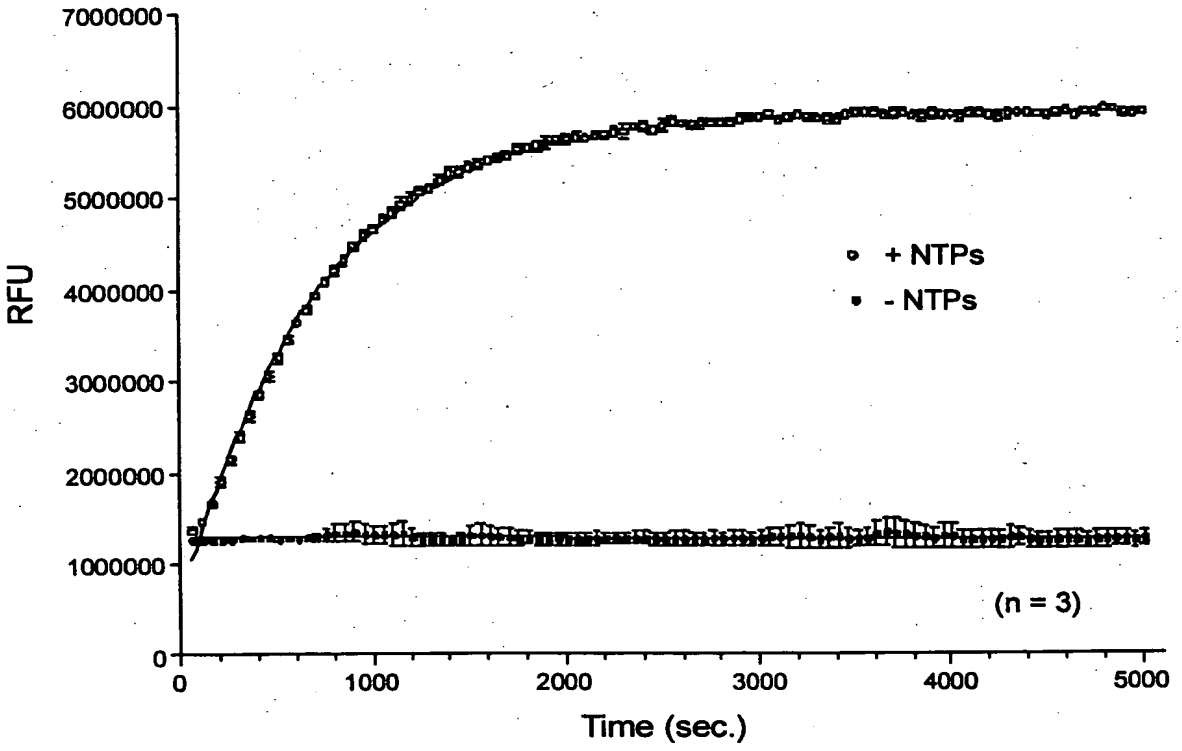

7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
RFU
0
1000
2000
3000
4000
5000
Time (sec.)
+ NTPs
- NTPs
(n = 3)

FIG. 4

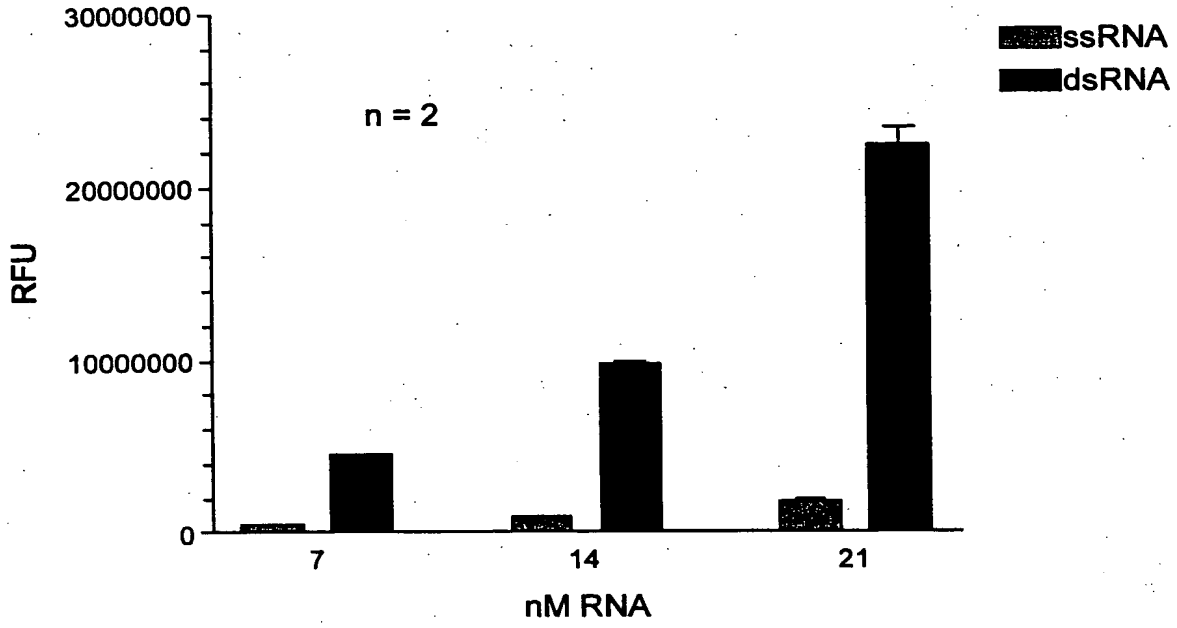

30000000
20000000
10000000
0
RFU
n = 2
ssRNA
dsRNA
7
14
21
nM RNA

FIG. 5A

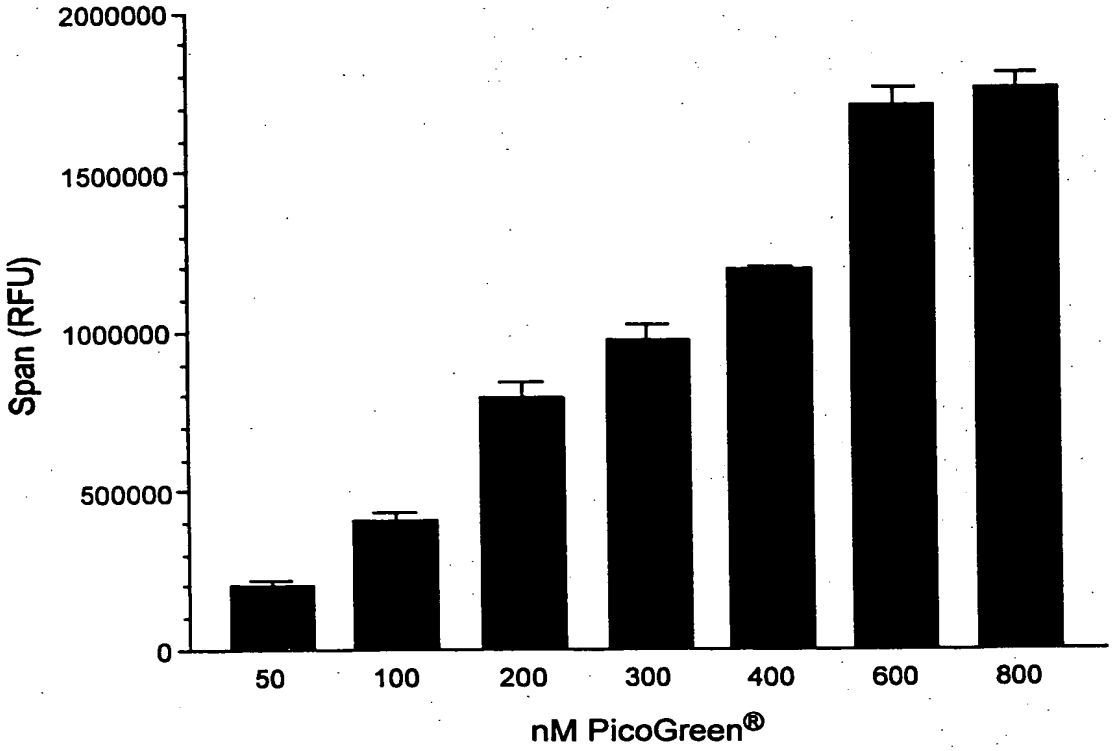

2000000
1500000
1000000
500000
0
Span (RFU)
50
100
200
300
400
600
800
nM PicoGreen®

FIG. 5B

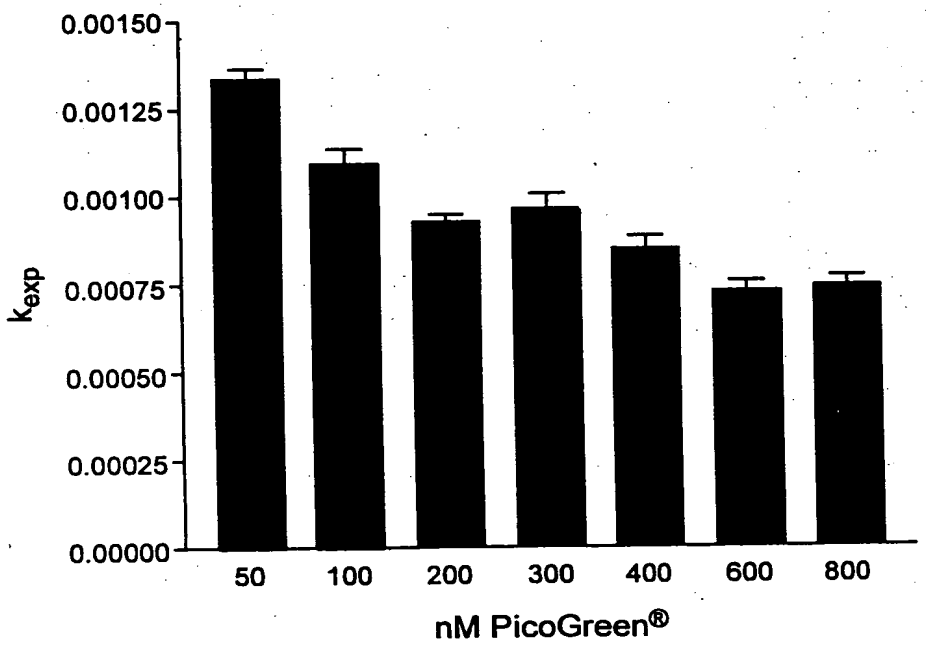

0.00150
0.00125
0.00100
0.00075
0.00050
0.00025
0.00000
k_{exp}
50
100
200
300
400
600
800
nM PicoGreen®

FIG. 5C

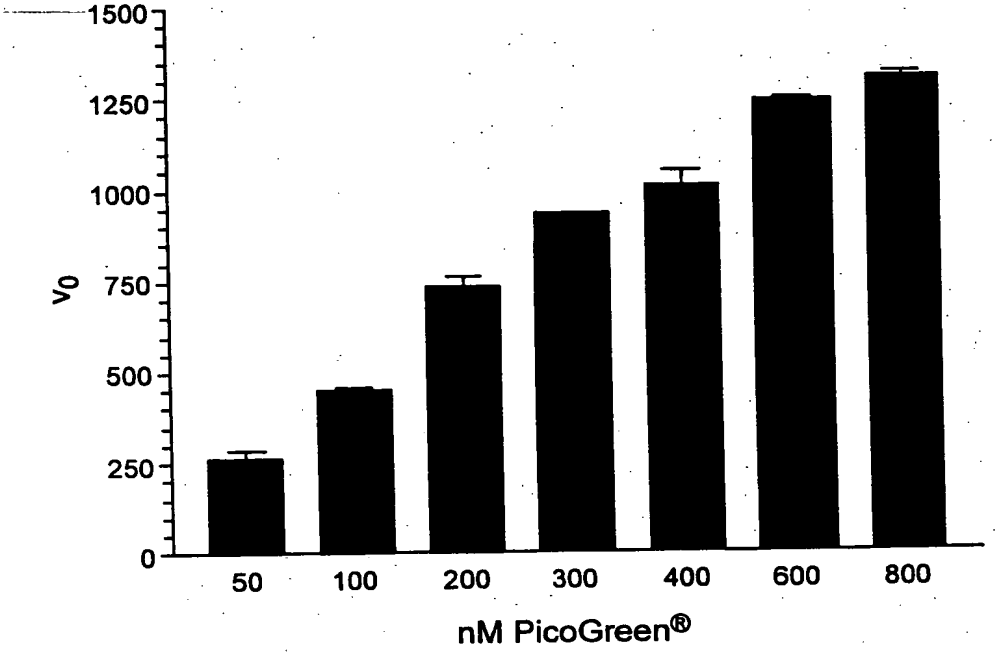

1500
1250
1000
750
500
250
0
V_0
50
100
200
300
400
600
800
nM PicoGreen®

FIG. 6

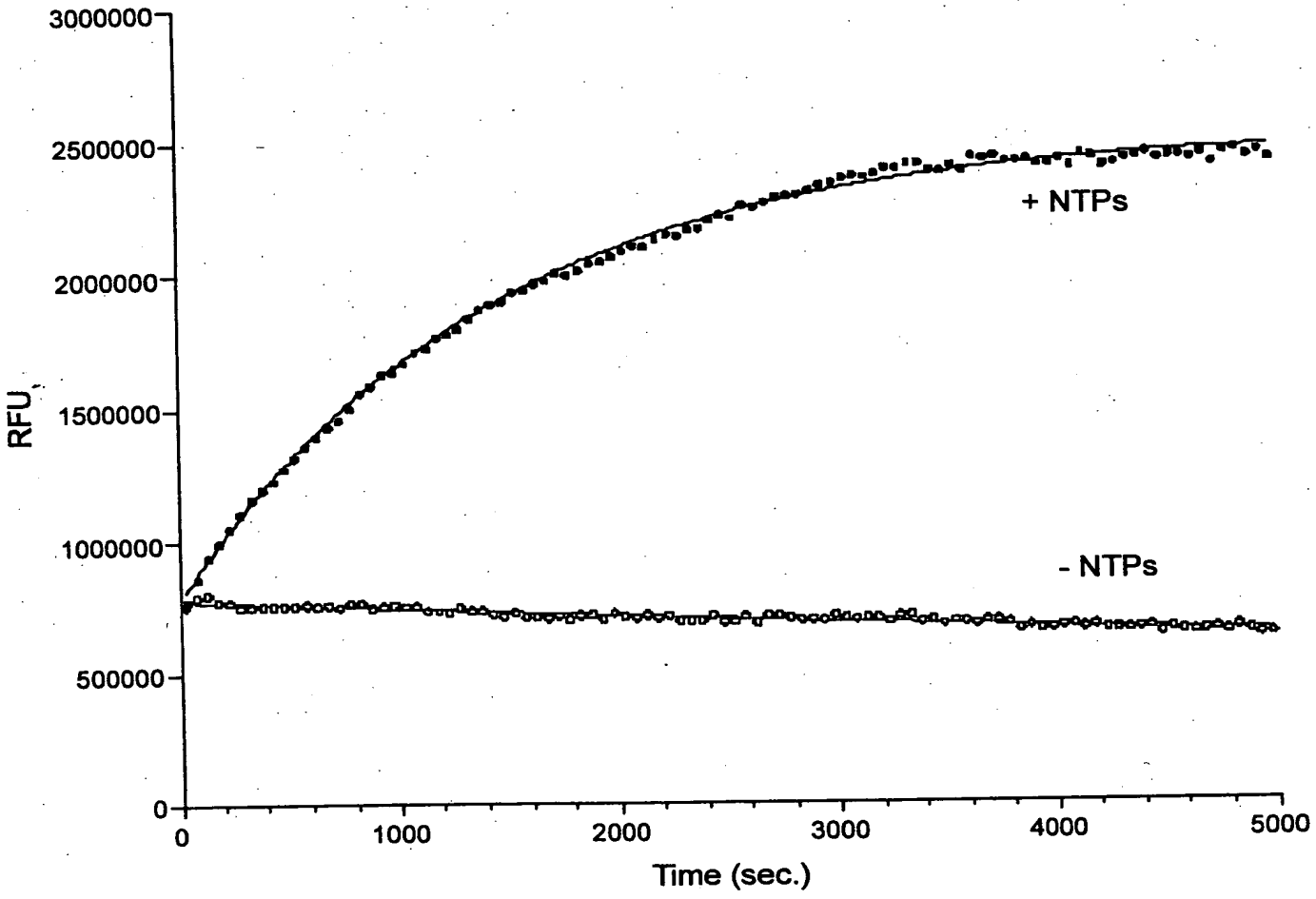

3000000
2500000
2000000
1500000
1000000
500000
0
RFU
0
1000
2000
3000
4000
5000
Time (sec.)
+ NTPs
- NTPs

FIG. 7

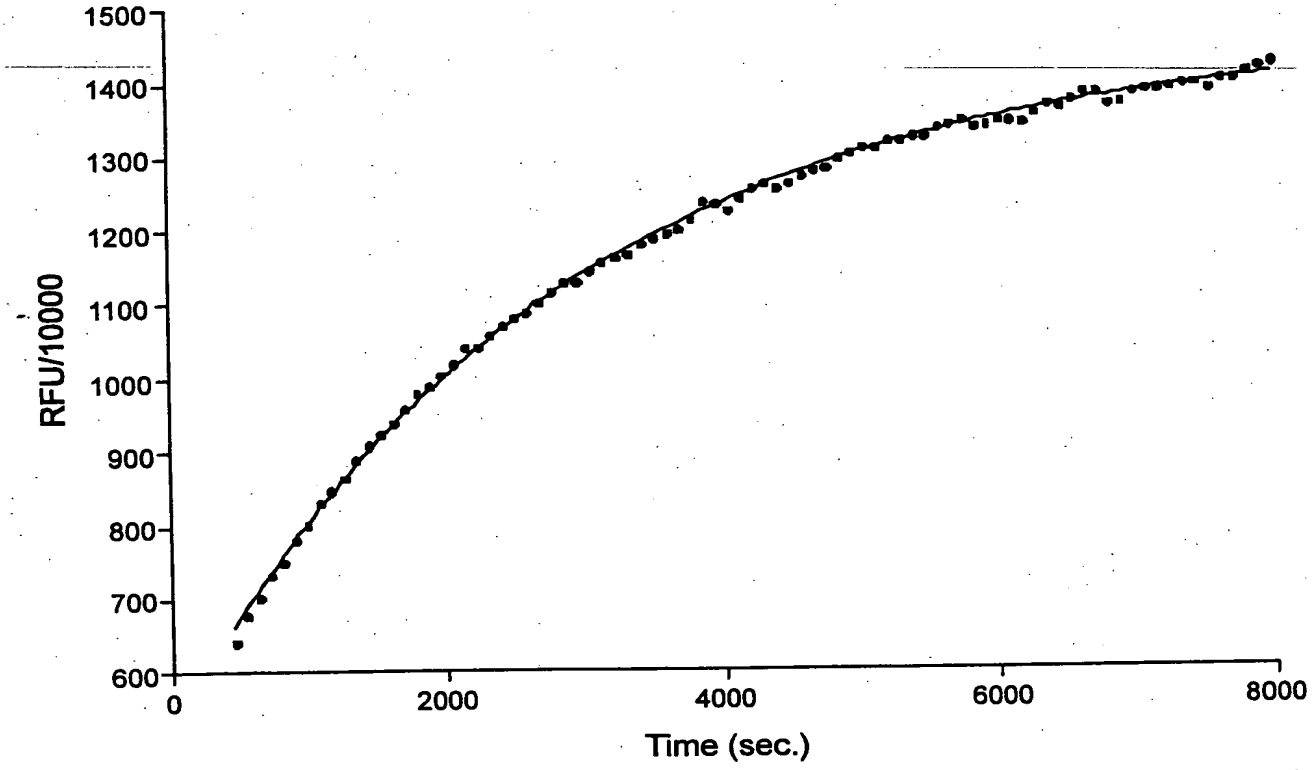

1500
1400
1300
1200
1100
1000
900
800
700
600
RFU/10000
0
2000
4000
6000
8000
Time (sec.)

FIG. 8

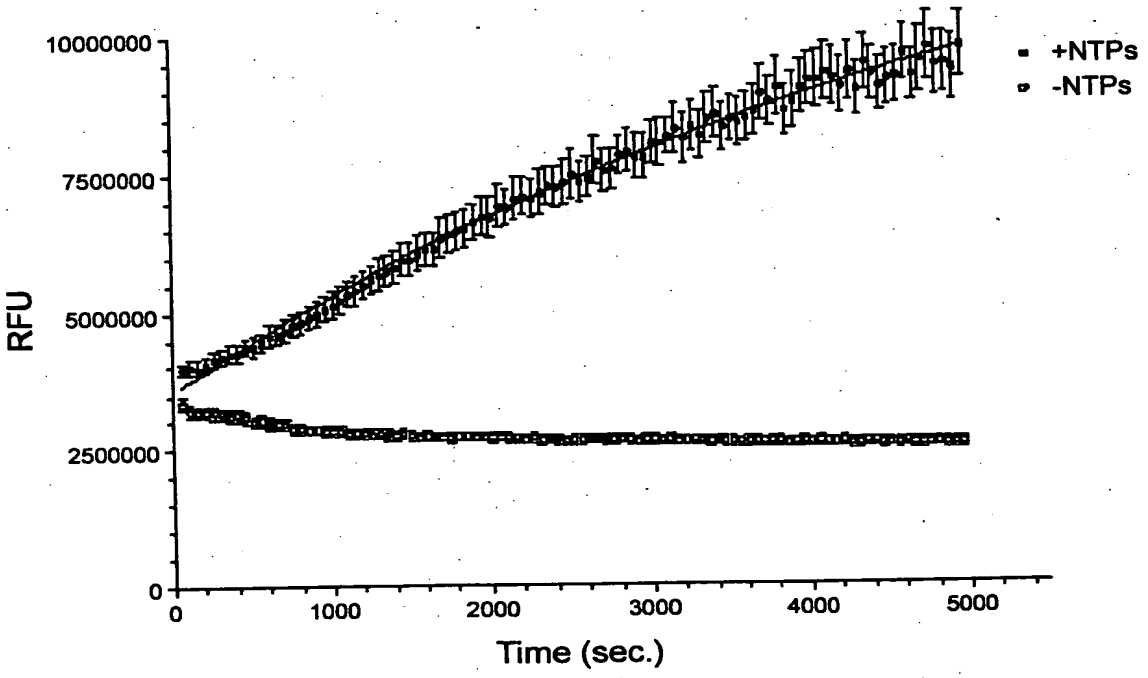
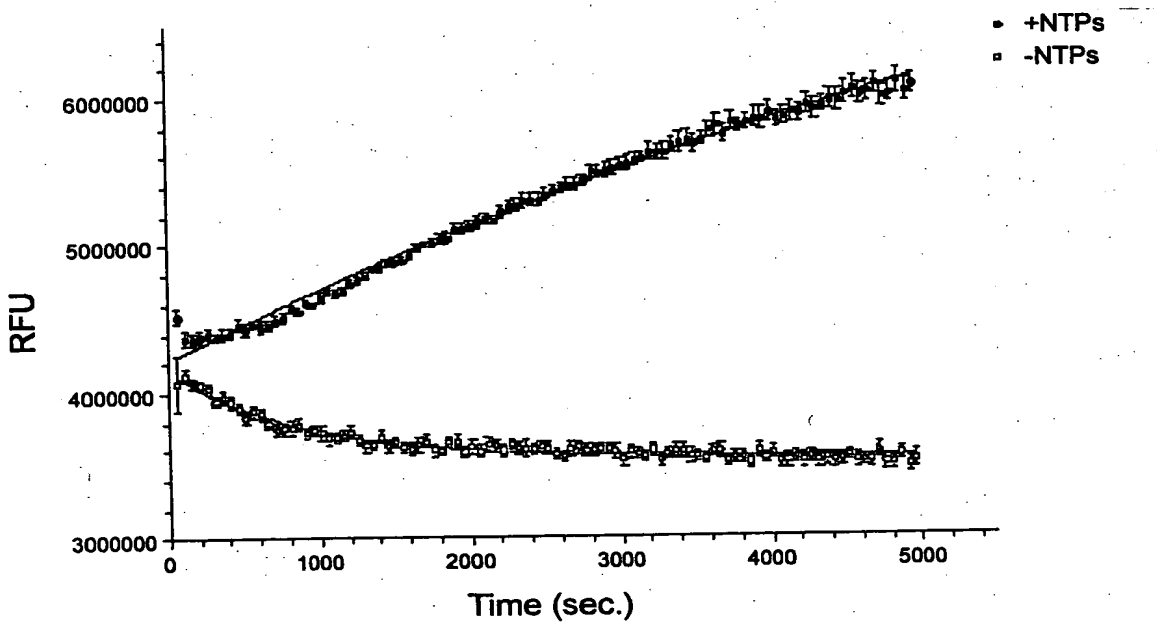

10000000
7500000
5000000
2500000
0
RFU
0
1000
2000
3000
4000
5000
Time (sec.)
+NTPs
-NTPs

FIG. 9


+NTPs
-NTPs
6000000
5000000
4000000
3000000
RFU
0
1000
2000
3000
4000
5000
Time (sec.)